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TEN LOPHOZIAS III.

From "Notes on New England Hepaticae."

DR. A. W. EVANS IN RHODORA.

Selected and Illustrated by Caroline Coventry Haynes.
[By permission.]

These Lophozias have been illustrated in various publications, but for two reasons I have figured them again: for the student as a handy reference, as well as for the sake of showing their comparative size. One magnification having been used, namely, $\times 22$ in all figures of plants; $\times 70$ in all figures of leaves; $\times 365$ in all figures of cell structures.

No. 1 appeared in THE BRYOLOGIST for November, 1906. Three species figured on Plate IX. *L. Marchica*, *L. bicrenata*, *L. excisa*. Reproduced in January, 1907, as Plate III. with corrected magnifications.

No. 2 in January, 1907. Five species figured on Plate II. *L. Floerkii*, *L. lycopodioides*, *L. Lyoni*, *L. gracilis*, *L. barbata*.

In conclusion, *L. Kunzeana* and *L. Muelleri* are given with *L. porphyroleuca* added to the original selection. Figured on Plate I.

"LOPHOZIA KUNZEANA (Hüben.) Evans, Proc. Wash. Acad. 2: 305. 1900. *Jungermannia Kunzeana* Hüben. Hep. Germ. 115. 1834. *J. plicata* Hartm. Fl. Scand. Ed. III. 2: 329. 1838. *J. colpodetes* Tayl. Lond. Jour. Bot. 5: 280. 1846. *J. plicata** *Kunzeana* Hartm. Fl. Scand. Ed. X. 2: 137. 1871. *J. Kunzei* β *plicata* Lindb. Musc. Scand. 8. 1879. *Sphenolobus Kunzeanus* Steph. Bull. de l'Herb. Boissier, II. 2: 168. 1902. Mt. Washington, New Hampshire (*W. G. Farlow*). *Lophozia Kunzeana* has a wide distribution in the alpine and arctic regions of the Northern Hemisphere, although it is rarely abundant in one locality. In North America it has already been recorded from Greenland, from several widely scattered stations in British America, and from the Adirondack Mountains of New York. It is, however, new to New England. Professor Farlow's specimens represent a gemmiparous and rather slender form of the species.

The leaves of *L. Kunzeana* vary in form from rotund to quadrate; they are subequally bifid and tend to be complicate, although this condition is not always apparent. In rare cases there is a third lobe supplementary to one of the others. The sinus is narrow and extends to the middle or a little less. The divisions are typically rounded at the apex but are often obtusely pointed or, on slender branches, even acute. The leaf-cells have small but distinct trigones, and the cuticle is minutely verruculose or striate. The underleaves vary in size but can usually be demonstrated without much difficulty in spite of the numerous rhizoids. They are either subulate and long-acuminate or else deeply bifid with slender divisions. The gemmae when mature are thick-walled and angular; as a rule they are unicellular but are

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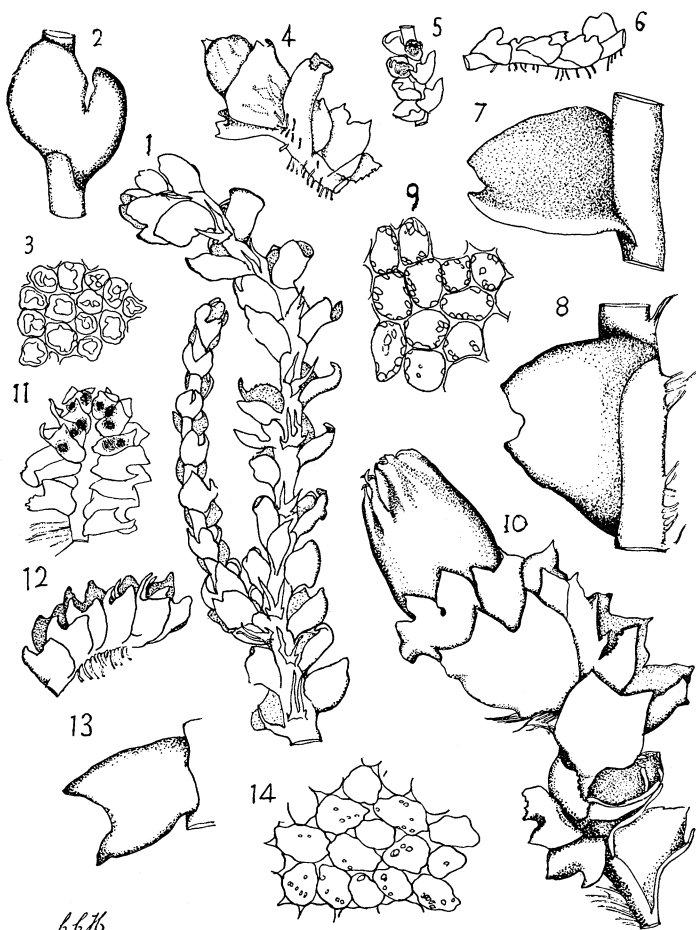


PLATE I.

Figs. 1-3. *Lophozia Kunzeana* 1—Plant, showing underleaves and innovations $\times 22$. 2—Leaf, dorsal view $\times 70$. 3—Leaf cells $\times 365$.

Figs. 4-9 *Lophozia Muelleri*. 4—Plant, showing perianth $\times 22$. 5—Male plant, dorsal view $\times 22$. 6—Plant $\times 22$. 7—Leaf, dorsal view $\times 70$. 8—Leaf, ventral view $\times 70$. 9—Leaf cells $\times 365$.

Figs. 10-14 *Lophozia porphyroleuca* 10—Plant, showing perianth $\times 22$. 11—Male plant, dorsal view $\times 22$. 12—Plant $\times 22$. 13—Leaf, dorsal view $\times 70$. 14—Leaf cells $\times 365$. All reduced one-half.

sometimes divided by a delicate wall into two cells. In exposed localities the stems, leaves and gemmae acquire a characteristic brownish yellow coloration.

The presence of underleaves will at once distinguish *L. Kunzeana* from such species as *Sphenobolus Michauxii*, *Marsupella emarginata* and *Lophozia inflata*, all of which it somewhat resembles in general appearance. Among New England species its closest relative is undoubtedly *L. Floerkii*, which has trifid or quadrifid leaves with a little group of marginal cilia close to the postical base. There is usually no indication whatever of basal cilia in *L. Kunzeana*, although sometimes one or two minute and indistinct teeth may be found in this position.¹ Its relationship to *L. Floerkii* and to other members of the *barbatae*-group is clearly shown by the occasional presence of a third lobe and by the constant occurrence of underleaves, and it would seem as if these characters were sufficient to exclude it from the genus *Sphenobolus*, where it is placed by Stephani." EVANS, Rhodora, 7: 52. 1905.

PLATE I. Figs. 1-3. 1—Plant, showing underleaves and innovation $\times 22$. 2—Leaf, dorsal view $\times 70$. 3—Leaf cells $\times 365$. Drawn from material collected by M. C. A. Grape, Sweden, 1905. Sulliv. Moss Chapter Herb.

"LOPHOZIA MUELLERI (Nees) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia Muelleri* Nees; Lindenberg, Nova Acta Acad. Caes. Leop.-Carol. 14: suppl.: 39. 1829. *J. acuta* Lindenb. l. c. 88 (in part). *J. Libertae* Hüben. Flora 15: 305. 1832. *Lophozia acuta* Dumort. Recueil d'Obs. sur les Jung. 17. 1835 (in part). *J. Laurentiana* DeNot. Mem. Accad. Tor. II. 18: 497. f. 10. 1859. *Lophozia Libertae* Cogn. Bull. Soc. roy. Bot. de Belgique 10: 278. 1872. *J. bantriensis*, vars. *Muelleri* and *acuta* Lindb. Acta Soc. Sci. Fenn. 10: 528. 1875. *J. Hornschuchiana Muelleri* Massal. Ann. R. Ist. Bot. di Roma 3: (8). 1888. On limestone rocks. Banks of the Housatonic River (opposite Falls Village), Salisbury, Connecticut (*A. W. E.*). Already reported from Miquelon Island, from a few stations in Canada and from Colorado, but apparently new to the eastern United States. *Lophozia Muelleri* is a member of a group of closely related species which have long been a puzzle to European hepaticologists. The group has recently been studied by Schiffner,² who ascribes to it the following characters: leaves always bifid; underleaves more or less developed even on slender stems; perichaetial bracts usually but little differentiated from the leaves; perianth cylindrical or barrel-shaped, terete (or slightly plicate in the upper part), contracted into a tubular beak; perigonal bracts with a third dorsal tooth. Schiffner recognizes seven species, five of which have been recorded from North America. *L. Muelleri* is distinguished from its allies by its relatively small size, by its more or less acute leaf-lobes, by its rather thin-walled leaf-cells with small but distinct trigones and a minutely verruculose or striate cuticle, by its dioicous inflorescence and by its lack of gemmae. Its nearest relative is doubtless *L. heterocolpa* (Thed.) M. A. Howe, which is known in North America from Greenland, from the shores of Lake Superior,

1. See Schiffner, Lotos, 49: 51. 1901.

2. Verhandl. der k. k. Zool.-Bot. Gesellsch. in Wien. 54: 381-405. 1904.

and, in the Pacific Coast region, from Yukon to California. This species is a little larger than *L. Muelleri*, the lobes of its leaves are commonly obtuse, and it produces gemmae abundantly. Among New England species *L. excisa* and *L. ventricosa* both bear some resemblance to *L. Muelleri*. These species, however, are destitute of underleaves and their perianths are widely open and dentate at the mouth. Other members of the *L. Muelleri*-group are perhaps to be expected in New England, especially in limestone districts." EVANS, *Rhodora* 8: 35. 1906.

FIGS. 4-9. 4—Plant, showing perianth $\times 22$. 5—Male plant, dorsal view $\times 22$. 6—Plant $\times 22$. 7—Leaf, dorsal view $\times 70$. 8—Leaf, ventral view $\times 70$. 9—Leaf cells $\times 365$. Drawn from material collected by Dr. A. W. Evans, Salisbury, Conn., 1897; fruiting specimens collected by Dr. Chas. Lacouture, France, 1904. Sulliv. Moss Chapter Herb.

"LOPHOZIA PORPHYROLEUCA (Nees) Schiffn. *Lotos* 51: (61). 1903. *Jungermannia porphyroleuca*, Nees, *Naturgeschichte der europ. Leberm.* 2: 78. 1836. *J. ventricosa* b. *porphyroleuca* Limpr.; Cohn, *Krypt.-Flora von Schlesien* 1: 280. 1876. Mt. Bigelow, Maine (*J. F. Collins* and *M. L. Fernald*, 1498, 1573). White Mountains (*W. Oakes*). Guilford, New Hampshire (Mrs. Corter). Although this species was recorded from New England by Austin¹ many years ago, it has received but scant attention from North American writers and has usually been considered a simple synonym of *L. ventricosa*. Even in Europe it has been looked upon as a species of doubtful validity. When Arnell² studied the forms belonging to the *ventricosa*-groupe a few years ago he found that the leaf-cells in *L. porphyroleuca* had large trigones while those of *L. ventricosa* had small trigones or were thin-walled throughout. Since these differences were inconstant and he could find no others to support them, he decided that *L. porphyroleuca* was hardly worthy of specific rank. Recently, however, Schiffner has shown that other differential characters may be derived from the mouth of the perianth. In *L. porphyroleuca* this is split into numerous acute lobes; the margins of these lobes are thickly and irregularly ciliate-dentate, some of the teeth attaining a length of three or four cells. In *L. ventricosa* the lobes are indistinct, and the marginal teeth are scattered and usually unicellular. It may be added that *L. porphyroleuca* grows on rotten wood and is commonly more or less tinged with red, while *L. ventricosa* usually grows on the ground or on rocks and is mostly dark green in color. Although reported from so few localities *L. porphyroleuca* is probably widely distributed in the mountains of New England." EVANS, *Rhodora* 8: 36. 1906.

FIGS. 10-14. 10—Plant, showing perianth $\times 22$. 11 - Male plant, dorsal view $\times 22$. 12—Plant $\times 22$. 13— Leaf, dorsal view $\times 70$. 14—Leaf cells $\times 365$. Drawn from material (Figs. 10, 14.) collected by Miss A. Lorenz, Vermont, 1904. (Figs. 11, 13.) collected by Mrs. L. A. Carter, New Hampshire, 1902. (Fig. 12.) collected by C. C. Haynes, Adir. Mts. 1902. Above specimens in Sulliv. Moss Chapter Herb. New York City.

(Conclusion.)

1. Proc. Acad. Philadelphia for 1869: 220.

2. Bot. Not. 1820: 195. E. Bauer has published a German translation of Arnell's paper in *Lotos* 41. 1893.